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THE University of Pennsylvania Press has published a 'Syllabus of Lectures on the Vertebrata,' by the late Professor E. D. Cope. It is stated in the preface that the book is a corrected and extended edition of 'The Syllabus of Lectures on Geology and Paleontology,' Part III.: 'Paleontology of the Vertebra,' published in 1891, and was originally designed for use in the extension lectures of the University. The book includes an introduction of thirty-five pages on the 'Life and Works of Cope,' by Professor Osborn, and a portrait of Cope as frontispiece. A limited number of copies of this work is offered for sale, in cloth for \$1.25, or with a paper cover for \$1.00.

THE first of the four volumes of Huxley's Scientific Memoirs has been issued. The work, which Professor Michael Foster and Professor Ray Lankester are editing, is being published by The Macmillan Company as a contribution to the Huxley memorial. A portrait of Huxley, taken in 1857, serves as a frontispiece of the volume, which contains 600 pages.

MESSRS. G. P. PUTNAM'S SONS have just issued, as the first volume of their 'Science Series,' 'The Study of Man,' by Professor A. C. Haddon. They have arranged for the following volumes of the series in addition to those already announced: 'Rivers of North America,' by Professor Israel C. Russell; 'Whales,' by F. E. Beddard; 'Bacteria,' by Dr. J. H. Gladstone; 'History of Botany,' by Professor A. H. Green; 'Planetary Motion,' by Dr. G. W. Hill, and 'Infection and Immunity,' by Dr. George M. Sternberg. The title of Professor Young's book has been changed to 'Meteors and Comets,' and that of Professor Brinton's to 'Ethnic Psychology.'

M. MOURLON, of the Belgian Geological Survey, writes that the favorable reception met with by Volume I. of the series B of the *Bibliographia geologica*, cataloguing the publications since the 1st of January, 1896, and Volume II., soon to be ready, leads the Survey to publish Volume I. of the series A, or retrospective series, giving the titles of geological publications published prior to 1896. The first volume of this series will comprise the titles of all geological publications of the library of the Geological Survey,

and will consequently constitute the first part of the catalogue of this library (drawn up according to the decimal classification). Authors are requested to send copies of their publications in order that they may be included in the Bibliography.

#### UNIVERSITY AND EDUCATIONAL NEWS.

THE late A. S. Van Wickle, of Hazleton, Pa., has bequeathed \$45,000 each to Princeton University and to Brown University and \$30,000 to Lafayette College.

CHANCELLOR MACCRACKEN, of New York University, has announced an anonymous donation, thought to be from Miss Helen Gould, of \$50,000 to New York University.

MT. HOLYOKE COLLEGE receives \$5,000 by the will of the late Elijah A. Morse, and Tufts College \$2,000 by the will of the late Mrs. Eugenia Stowe, of Meriden, Conn.

THE Board of Trustees of the University of Rochester has adopted resolutions admitting women to the institution when \$100,000 shall have been raised for the purpose.

AT the recent commencement exercises of the University of Nebraska 88 students were admitted to the degree of Bachelor of Arts, 44 to the degree of Bachelor of Science, 39 to the degree of Bachelor of Laws, 40 to the degree of Master of Arts, and 2 to the degree of Doctor of Philosophy. The University long since abandoned the practice of conferring advanced degrees upon any other basis than that of resident work under the direction of the faculty.

IT is reported that President Andrews, of Brown University, has been offered and will accept the superintendency of the public schools of Chicago.

THE following promotions have been made at Johns Hopkins University: Dr. Joseph S. Ames to a full professorship of physics; Dr. J. Elliott Gilpin and Dr. Harry C. Jones to be associates in chemistry and physical chemistry, respectively, and Dr. Luis E. Livingood to be associate in pathology. The Bruce fellowship was awarded to Gilbert A. Drew, of Iowa, who this year receives the degree of Ph.D. in biology.

AT a recent meeting of the Regents of the University of Nebraska, Dr. Frederic E. Clements was promoted from the position of assistant to that of instructor in botany. The following were elected fellows for the collegiate year 1898-9: In mathematics, C. C. Engberg and Alta Johnson; in chemistry, Mariel C. Gere, Benton Dales and Howard C. Parmelee; in pedagogy, William R. Hart; in zoology, Albert B. Lewis and Charles C. Morison; in geology, Cassius A. Fisher; in physics, Samuel R. Cook; in electrical engineering, Charles H. True, and in botany, Albert T. Bell and Cora F. Smith.

MISS AGNES MARY CLAYPOLE, instructor in Wellesley College, has been appointed assistant in the department of histology and comparative physiology in Cornell University.

DR. SOPHUS LIE, professor of mathematics in the University of Leipzig, has *angenommen* accepted a call to the University of Christiania.

DR. GISEVINUS has been appointed associate professor of agriculture in the University of Königsberg; and Dr. Richard Wachsmuth, of Göttingen, has been called to a professorship of physics in the University of Rostock.

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#### DISCUSSION AND CORRESPONDENCE.

##### 'A PRECISE CRITERION OF SPECIES.'

THE papers by Professor C. B. Davenport and J. W. Blankinship, suggesting the determination of species by means of statistical methods, are welcome signs that the appreciation of the value of these methods is rapidly increasing among biologists. Heretofore they have been applied most extensively by anthropologists; consequently the inherent difficulties have become familiar to them, and their experiences will be useful to biologists who pursue these methods.

Statistical data are generally represented in the form of curves; and experience show that most curves, if the number of cases is sufficiently large, approximately conform to the probability curve. When the number of cases is small the curves tend to become more and more irregular, and the question arises: How

large must the number of cases be in order to be significant, that is to say, in order to justify us in assuming that the few selected individuals represent a curve which deviates from the probability curve? All the curves given by Professor Davenport and Professor Blankinship in their paper are based on material not sufficiently extensive to compel us to assume that the distribution differs from the law of probability. For example, the data contained in Fig. 9, which is one of the best of Professor Davenport's examples, are not of such a character that we must necessarily assume a curve deviating from the normal probability curve. If a thousand individuals had been measured instead of forty-six only, irregularities of the curve would probably disappear. The same is true of Professor Blankinship's measurements. The secondary maximum in his best table (No. VI., Fig. 17) is so uncertain that, until further data are forthcoming, we must assume that with an increased number of measurements the secondary maximum will disappear entirely.

Furthermore, it must be considered that under certain conditions the distribution of measurements cannot conform to the probability curve. Such is the case in conditions like those exemplified in Table VII. of Professor Blankinship's paper. Here the greatest relative frequency is that of the value zero. Smaller values are not possible; consequently all the variations must be on the positive side. The same is true wherever the measured value is very near zero. In these cases the distribution must be a symmetrical.

But granted the supposition that curves exist which have more than one maximum, the question arises whether we are justified in assuming that the two maxima represent two species inhabiting the same area. First of all, it must be mentioned that, assuming equal frequency and equal variability of the two species, two maxima will occur only when the distance between the two types is greater than the standard deviation of either type. When the difference is less, the result is apparently an increased variability. When two maxima exist, the biological problem resolves itself into a mathematical analysis of the given curve. Owing to the impossibility of obtaining sufficiently extensive material, and to the consequent inaccuracies of the results of